Lexical Access in Anomic Aphasia: The Effects of Connection Strength

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- AphasiaBank (www.talkbank.org/AphasiaBank/)

INTRODUCTION

- A principle deficits in people with aphasia (PWA) is anomia (Goodglass & Wingfield, 1997)
- Dell et al. (1997) demonstrated that lexical access in PWA can be modeled by increasing the noise or weakening the connections between the semantic layer and phonological layer.
- In support of this theory, researchers using single concepts have determined that PWA have easier time accessing words that:
  - Have a higher frequency (Dede, 2012, Haley & Jacks, 2014)
  - Are more imaginable/concrete (Kiran et al., 2009)
  - Are more familiar (DeDe, 2012)
  - Acquired at an earlier age (Hirsh & Funnel, 1995).
- Currently, no one has measured lexical production within a discourse task in respects to word frequency, imagability/concreteness, familiarity, or age of acquisition.

Purpose and Hypothesis

- Purpose: Determine if people with anomic aphasia produce nouns within narrative discourse that have higher frequency, higher imagability, higher familiarity, and a younger age of acquisition compared to healthy controls.
- Hypothesis: PWA will produce nouns that require higher frequencies, imagability, and familiarity, as well as, words that are acquired earlier in life within narrative discourse.

Participants

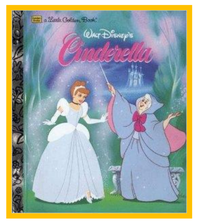
	Anomic Aphasia (N=114)	Control (N=112)
F:M	52:62	72:40
Age (SD)	62.89 (11.85)	56.33 (16.25)
Education (SD)	16.00 (2.83)	15.62 (2.25)
WAB AQ	84.36 (7.01)	N/A

- PWA had left hemisphere damage, anomic aphasia, chronic aphasia, no reported history of neurodegenerative disorders, and passed hearing and visual screeners
- Controls had no history of stroke or head injury, passed hearing and visual screenings, and had normal cognitive function as indicated by MMSE

METHOD

Discourse Measure:

Cinderella (Grimes, 2005)



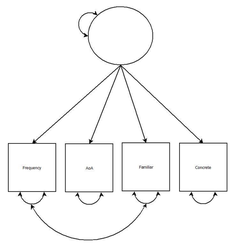
Noun Extraction in CLAN:

Separate Cinderella Narrative:
gem +t*PAR +sCinderella +d +f +2 +n *.cha
Generate Morphological Analysis:
mor +t*PAR *.gem.cex
Generate Syntactic Categories:
post +t*PAR *gem.mor.cex
Noun Extraction:
freq +t%mor +s"n|*" +s":*" +d2 *.gem.mor.pst.cex

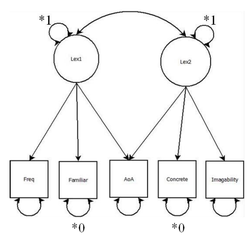
Clearpond Database &
MRC Psycholinguistic Database

- Frequency: How often a word is used
- Imagability/Concreteness: How easy it is to picture the word
- Age of Acquisition: Mean age of acquiring a word
- Familiarity: How familiar the concept is to individuals

1-Factor Model



2-Factor Model



2-Factor Model Invariance Testing

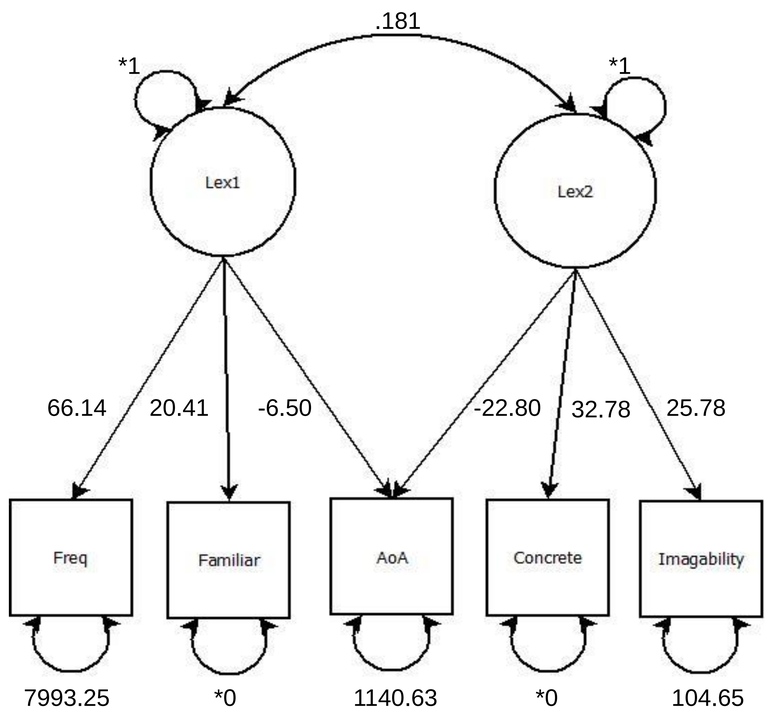
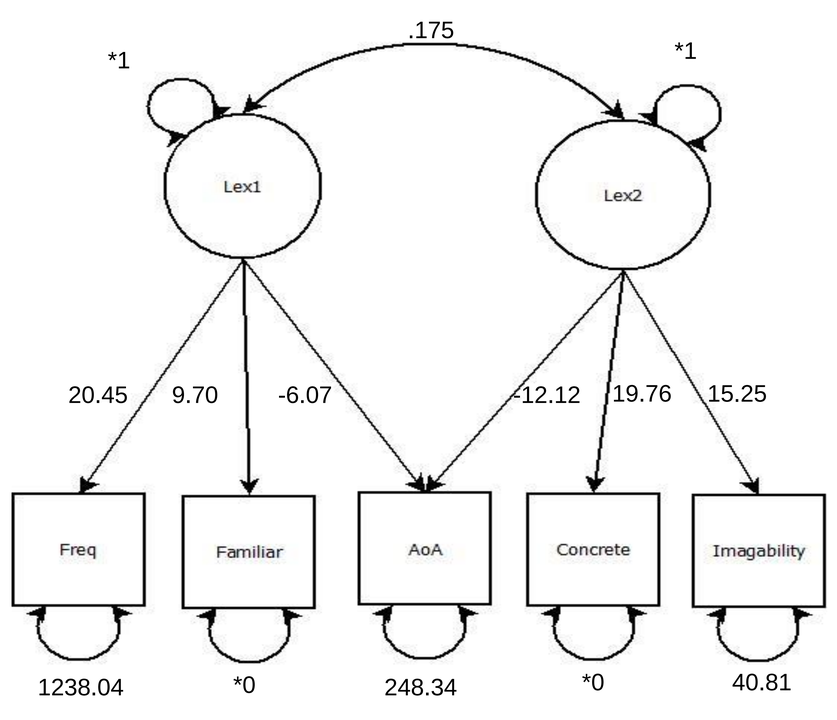
	Configural	Weak	Strong
χ^2	(10) = 33.58, p < .001	(14) = 40.12, p <.001	(17) = 49.67, P = .023
RMSEA	.145	.129	.131
SRMR	.045	.061	.074
CFI	.964	.960	.950
TLI	.928	.943	.941
$\Delta\chi^2$		(4) = 6.5468, (5) p = .16	(3) = 9.547, p = .023
ΔCFI		.004	.01

DISCUSSION

- The Configural Model indicated that the groups have a similar factor structure.
- The Weak Invariance Model indicated that the groups had similar factor loadings.
- The Strong Invariance Model indicated that the latent means differed.
- The similar factor structure and loadings agree with Dell et al. (1997) who suggested that PWA and healthy controls have a similar cognitive apparatus when accessing lexical items.
- The results extend connection strength research into the realm of narrative discourse.
- The factor loading agree with single concept research that suggest to overcome the noise within the lexical access system, lexical items need to be:
  - more frequent
  - more familiar
  - more concrete
  - acquired earlier.
- Discourse is more sensitive than standardized tests (Marini et al., 2011), and the current study extends the usefulness of discourse samples in assessing lexical access.
- Future research should determine if this method of assessing lexical access is correlated with other standardized tests of lexical access and aphasia impairment.

RESULTS

Anomic Aphasia



Healthy Controls